



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/586,548

07/19/2006

Shunji Kikuhara

TAN-126

6462

54630 7590 06/24/2010

ROBERTS & ROBERTS, LLP  
ATTORNEYS AT LAW  
P.O. BOX 484  
PRINCETON, NJ 08542-0484

EXAMINER

LIAO, DIANA J

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/24/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,548	<b>Applicant(s)</b> KIKUHARA ET AL.	
	<b>Examiner</b> DIANA J. LIAO	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-17 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 2, 4-12, 14-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu, et al. (US 6,107,240), optionally in view of Mackrodt, et al. (US 5,137,862) and Marecot, et al. (US 5,413,984).

Wu '240 teaches a catalyst for use in engine exhaust. The catalyst comprises an oxygen storage component comprising a mixed oxide of cerium and praseodymium segregated having a catalytically active platinum component dispersed thereon. (claim 1) The mixed oxide may also comprise another rare earth element. (claim 6) Since this oxygen storage component does support catalytic metal and is specifically segregated from any other carrier or support, this oxygen storage component is found to be equivalent to a support. Even though the catalyst composition as a whole contains an

Art Unit: 1793

additional carrier material, since the instant claim utilizes open "comprising of" language and it is only necessary for *a carrier* to be consisting of a mixed rare earth oxide, the claim is not found to exclude the presence of an additional carrier material. The platinum group components include platinum, ruthenium, palladium, and iridium. (col 4, lines 10-12)

Regarding the inclusion of lanthanum as part of the cerium and praseodymium mixed oxide, Wu '240 teaches that another rare earth metal may be included. Although lanthanum is not specifically named as this additional oxide, it is one of the rare earth metals tested in conjunction with cerium oxide. (Table II) It would have been obvious to include any rare earth metal with the cerium and praseodymium oxide as obvious alternatives to one another. In addition, Wu '240 mentions yttrium, lanthanum, and neodymium as rare earth oxides in general, which would suggest to one of ordinary skill in the art that those rare earth metals are specifically suitable.

Regarding the composition of the oxide and amounts of supported metals, it would have been obvious to one of ordinary skill in the art to optimize the percentages of the oxides and catalytic species to best treat the exhaust gas. Wu '240 teaches atom percentages which would appear to correspond to overlapping ranges for the claimed oxide weight percentages. Wu '240 teaches a loading of not more than 10% by weight of a platinum group component to enhance activity (col 10, lines 23-29), also overlapping the claimed ranges and generally teaching a similar magnitude of catalytic metal loading.

Regarding washcoating onto a metal base, Wu '240 does not specifically teach the use of a metal base. However, metal substrates are well known in the art and it would have been obvious to one of ordinary skill to choose an appropriate substrate. Wu '240 allows for the oxygen storage component to be layered over another layer. (col 5, lines 5-12) The underlying support of the mixed rare earth oxide does not have an apparent unexpected or critical effect on the functionality of the catalyst. Metallic substrates are known for reaching high temperatures quickly and having low deterioration rates at high temperatures, for example. Therefore, applying a washcoat to a metallic base is not found patentable over the prior art.

Optionally, regarding the identity of the rare earth oxide used as a support and the weight percentages of each component, Mackrodt '862 teaches a mixed oxide suitable for use as an oxidation catalyst at temperatures above 1000°C. (col 3, lines 17-21) A preferred composition comprises cerium, praseodymium and a rare earth, especially lanthanum. The praseodymium accounts for 5-10% of the rare earth atoms, and 0.5-2.5 lanthanum atoms for each praseodymium atom. (col 5, line 65-col 6, line 2) Some suitable percentages are 60-90% cerium, 5-25% praseodymium, and 5-40% lanthanum. (col 5, lines 58-64) As can be seen in Table 1, the compositions containing cerium, praseodymium, and lanthanum have some of the highest activity rates at 600°C for the formation of CO<sub>2</sub>. (col 8, lines 13-51) These rare earth oxide oxidation catalysts are thought to adsorb oxygen atoms through defects and vacancies (col 3, lines 46-54), or in other words, they are oxygen storage/release components.

One of ordinary skill in the art would have been motivated to use the high activity cerium-praseodymium-lanthanum oxide taught in Mackrodt '862 as the oxygen storage component in Wu '240 since Mackrodt '862 teaches this specific combination as having high activity and both references discuss the main mechanism as oxygen storage/adsorption. Even though Mackrodt '862 teaches that its catalyst specifically does not comprise catalytic metals such as Group VIII and platinum metals, this is not found to teach away from the use of such in conjunction with the mixed rare earth oxide. Mackrodt '862 discusses that these oxides may be used on their own in environments of above 1000°C where some catalytic metals may sinter or volatilize. (col 2, lines 22-24) In lower temperature situations, this concern becomes moot. Mackrodt '862 demonstrates that the mixed oxide does display significant activity at lower temperatures, such as 600°C, and one of ordinary skill in the art would have still been motivated to incorporate this oxide composition into the catalyst of Wu '240.

Optionally, regarding using multiple catalytic metals in the case that the use of platinum or Group VIII group metals in general as taught by Wu '240 does not suggest the use of multiple combinations of metals, Marecot '984 teaches the known practice in the art to utilize more than one catalytic species to increase the scope of catalyst activity. Marecot '984 teaches the creation of a multi-metal catalyst containing at least one metal A and at least one metal B. (claim 1) The metals are chosen from Groups VIII and IB. These groups include iron, ruthenium, iridium, platinum, and silver. (col 3, lines 22-25) Porous carriers known in the art for such catalyst compositions include oxides of

Art Unit: 1793

cerium or zirconium. (col 1, lines 32-37) Multimetal catalysts are often employed in order to broaden the range of activity of the catalyst. Examples of improved catalytic activity are discussed in different applications. (col 1, lines 14-23) The method of Marecot '984 may be utilized for a variety of catalysts, including the conversion of exhaust fumes containing carbon monoxide or soot. (col 5, lines 23-28)

Therefore, regarding the choice of metals and the ratios, it would have been obvious to utilize two or more catalytic species in the catalyst composition of Wu '240. Upon choosing the more than one catalytic metal in view of the teaching of Marecot '984, it would have been obvious to one of ordinary skill in the art to optimize the catalyst composition according to the intended use.

Therefore, claims 1, 2, 4-12, 14-17 and 20 are not found patentable over the prior art.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu and '240 and optionally Mackrodt '862 and Marecot '984 as applied to claims 1, 5 and 11 above, and further in view of Silver (US 6,455,182).

Wu '240 and Mackrodt '862 do not specifically mention the use of silver as a catalytic metal.

Silver '182 teaches a catalyst composition for a shift converter containing a ceria mixed oxide and a supported noble metal. Shift converters are used to reduce the CO content in process gases. (col 1, lines 35-41) This is otherwise known as the water gas shift reaction. (col 2, lines 26-30) Noble metal is to be supported in an amount of 0.1-

Art Unit: 1793

2.0%. (col 4, lines 41-52) The catalytic noble metals are chosen from a group including platinum, ruthenium, iridium, and silver. Metals may be used in combination. (col 6, lines 20-31)

Regarding the identity of the supported precious metal or an oxide thereof, Silver '182 recites the claimed metals of ruthenium, platinum, iridium, and silver. The metals are also taught to be supported in an amount of 0.1-2.0 mol%, which would overlap with the claimed range of 0.1 to 10 wt.%. Silver '182 teaches that a combination of metals may be supported onto the catalyst, but does not specify the ratios of specific metals to one another.

One of ordinary skill in the art would have been motivated to include other precious metals as taught in Silver '182 in order to improve the water gas shift reaction and the mitigation of CO in the exhaust gas. Wu '240 teaches a catalyst composition for the conversion of CO to CO<sub>2</sub> (col 5, lines 25-27) which is part of the water gas shift reaction. Thus, silver is found to be an obvious alternative to the catalytic metals discussed above, as well as combinations thereof.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1, 2, 4-17 and 20 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sauvion, et al. (US 4,940,685).

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **DIANA J. LIAO** whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 9:30am to 6:00pm EST.

Art Unit: 1793

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/  
Primary Examiner, Art Unit 1793

DJL